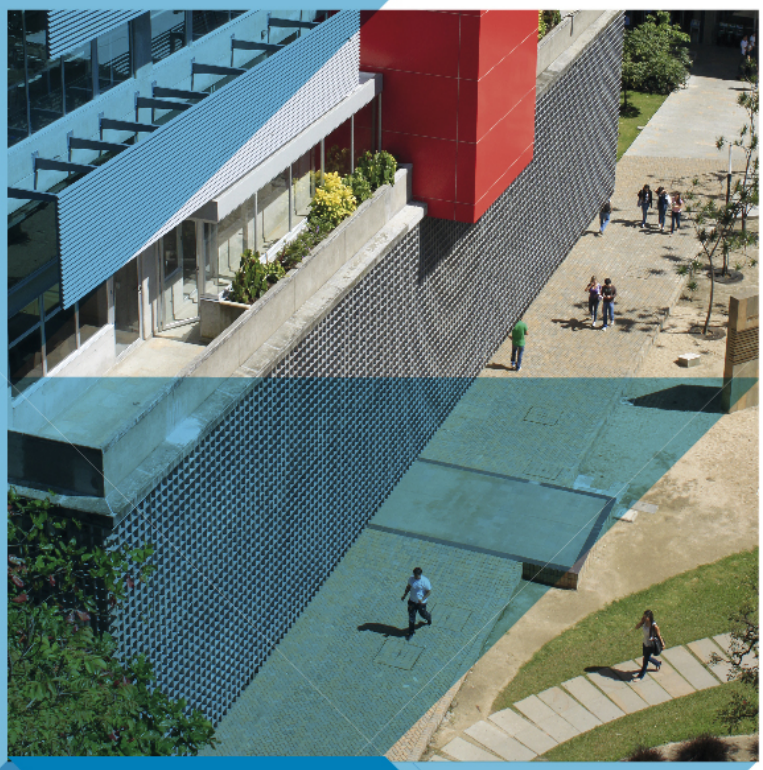

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Global trends in relative and absolute wealth concentrations

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Global trends in relative and absolute wealth concentrations

by

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Abstract

This paper compares changes in relative and absolute wealth concentrations to establish if both processes have followed similar trajectories. The findings indicate that while the level of relative wealth concentration has increased recently, it is not extraordinarily high in an historical perspective. On the contrary, the level of absolute wealth concentration is most likely higher than that previously occurred because of the increase in the wealth holdings and population size of high net worth individuals. The sustainability of this on-going absolute concentration of wealth is questionable insofar as the resulting pressure of investor demand for safe securities poses a potential threat for financial stability.

Keywords: wealth inequality; wealth concentration; extraordinary wealth; high net worth individuals

JEL Classification: D31; E21; N30; P46

1. Introduction

Trends in wealth inequality have long been the subject of fierce debate. On the one hand, Marx, Engels, and their followers argued that capitalism inevitably leads to extreme wealth concentrations, which can trigger the system's collapse. On the other hand, defenders of capitalism such as Porter, Giffen, and Marshall argued that wealth

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concentration was constant or narrowing but not growing (Lindert, 1986). However, neither capitalism's critics nor defenders have provided substantial evidence for their claims. This situation has changed somewhat thanks to the efforts of some economists that specialized in the history of inequality, but such discussions usually skirt the issue that inequality can be measured in both relative and absolute terms. This distinction is important, however, because recent works suggest that growing wealth holdings at the top contribute to a situation in which global demand for investible securities outstripped their supply. This imbalance was most likely a major driver behind the growth of the market for collateralized debt obligations (CDOs), the collapse of which triggered the subprime crisis (Lysandrou, 2011; Milanovic, 2011; Goda and Lysandrou, 2013). Therefore, the question arises whether the current degree of absolute wealth concentration is high in historical terms.

Relative inequality relates to the possession of wealth shares by specific groups (i.e., to the dispersion of wealth holdings between different groups within a population), while the concept of absolute wealth concentration in this paper is defined as the absolute amount of wealth holdings by one group of individuals, so called high net worth individuals (HNWIs).[1] Over the last decade, studies have increasingly measured and compared the distribution of wealth in relative terms for specific countries (see e.g., Ohlsson *et al.*, 2008) or globally (Davies *et al.*, 2010) but, surprisingly, so far no academic study has discussed changes in absolute wealth concentrations. The objective of this paper is to fill this gap by (i) providing an overview regarding HNWIs' total global wealth holdings and (ii) placing the holdings of the richest HNWIs in an historical perspective. Additionally, an overview of existing findings regarding historical trends of changes in relative wealth concentrations is provided to establish if both factors have displayed similar patterns of change.

The results of this study indicate that the concentration of relative global wealth increased significantly between 2000 and 2012. The main driver behind this increase is the rise in wealth inequality within most countries after the mid-1980s. Some causes among the possible ones for this rise in inequality are less progressive taxation, deeper globalization, and significantly increased top incomes. Apparently, though, the current

[1] Absolute inequality can also be measured via indices based on amount additions or subtractions, like the Kolm (1976) index. However, such a measurement is beyond the scope of this paper, as we are interested in the absolute amount of wealth holdings at the top and not those at the bottom (note that the creation of a long-run absolute wealth index would be very difficult due to data constraints).

high extent of relative wealth concentration is not exceptional when placed within an historical context. However, the opposite seems to be true for absolute wealth concentrations. This second finding can be attributed to the fact that overall global wealth has increased in general. Another equally important reason is that HNWIs have enjoyed an increase in both population size and wealth holdings in the last ten years (especially in developing countries).

The structure of the paper is as follows: Section two provides a brief overview regarding the wealth data sources and their shortcomings. Section three summarizes existing findings regarding the level and trend of relative wealth concentrations within countries and on a global scale, and discusses possible causes for their changes. Section four presents different estimates for the HNWIs absolute wealth holdings and population size and compares the absolute wealth holdings of today's richest persons with those of the richest person from throughout history in real terms. Section five summarizes the main findings of this study.

2. Wealth data sources and their shortcomings

Wealth inequality is usually measured in the same manner as income inequality. The two most widely used concepts to describe wealth inequality levels are the Gini Index and the relative concentration of wealth at the top (i.e., top wealth shares). However, in contrast to income inequality, only few studies have estimated the extent of within-country or global wealth inequality. This lack can be attributed to the fact that while income data already is relatively sparse and imprecise, the situation is even worse in the case of wealth data.

Data on wealth holdings are retrieved mainly from four sources: household surveys, household and financial balance sheets, tax records, and direct wealth estimates for named persons. Unfortunately, none of these data sources are free from severe shortcomings. Household survey data on wealth, for example, are less reliable than income data because wealth is more heavily skewed and thus sampling errors are more likely.[2] Furthermore, non-response and misreporting – deliberately or due to ignorance – are prevalent in households surveys (Guénard and Mesplé-Somps, 2010), and much of

[2] Very poor households (as they often have no registered address) and very rich households (as they are not easily accessible) often are underrepresented in surveys (see Atkinson and Brandolini, 2001).

the data are top coded (e.g., the US Survey of Consumer Finances excludes the 400 wealthiest families from its sample). It is therefore well known that surveys most likely underestimate the degree of wealth inequality and have a middle-class bias (Davies and Shorrocks, 2000, Shaxson *et al.*, 2012).

Consequently, some researchers (e.g., Davies *et al.*, 2007, 2010) prefer to use balance sheet data to measure wealth inequality levels because household balance sheets combine survey data with data from residual estimations. Still, they are not totally reliable because the residual values are retrieved by subtracting the balance sheet holdings of institutional households from total national balance sheet holdings, which often are subject to relatively large measurement errors.

Wealth or estate tax data are therefore often used instead to measure wealth inequality. These data have the advantage that their declaration is not voluntary and most of the population is covered (only deceased persons in the case of the estate tax). However, both sources share the disadvantage that the coverage, definition, and valuation of wealth depend on each nation's tax laws, and that the very rich part of the population often (successfully) tries to evade taxes (Palan *et al.*, 2010; Shaxson *et al.*, 2012). Estate tax data have the further shortcoming that less-wealthy individuals tend to die earlier and that the age distribution in the data therefore differs from that in the general population (Davies and Shorrocks, 2000).

Finally, so called 'rich lists' – like the Forbes 400 – are often used to measure the concentration of wealth at the top-end of the population and adjust wealth inequality estimates. However, these data are also problematic as they are derived from publicly-available information. This means that not necessarily all rich people are covered in these lists and that wealth estimates are therefore only based on informed guesses (Atkinson, 2008).

The estimates in the following section are mainly based on household survey data, balance sheet data, and estate tax data, while the section on absolute wealth concentration also relies on the direct wealth estimates for named persons as these are the best available data for HNWIs. Due to the above mentioned shortcomings, the presented inequality levels should be treated with caution though and most likely tend to be underestimated than overestimated.

3. Historical and current levels of relative wealth concentration

3.1. Historical changes of relative wealth concentration within developed countries

Existing figures suggest that "[w]ealth is distributed less equally than labour income, total money income or consumption expenditure. While Gini coefficients in developed countries typically range between about 0.3 and 0.4 for income, they vary from about 0.5 to 0.9 for wealth. Other indicators reveal a similar picture. The estimated share of wealth held by the top 1 percent of individuals or families varies from about 15-35 percent, for example, whereas their income share is usually less than 10 percent." (Davies and Shorrocks, 2000, p.607).

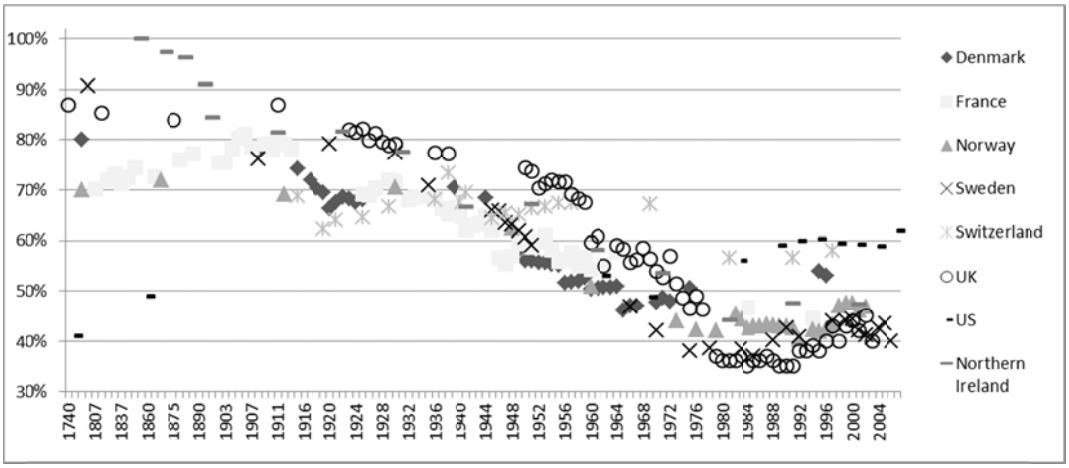
Such high levels of wealth inequality are not a new phenomenon. The Gini coefficient for asset holdings in the US was, for example, 0.64 in 1774 and rose to 0.83 in 1870 (Williamson and Lindert, 1980). This rise in wealth inequality reflects the fact that the richest individuals could more than double their wealth share during this period. In 1774, the top 1% held around 13% of all assets, increasing to around 27% in 1870. The wealth holdings of the top 10% also increased from around 50% in the revolutionary period to around 70% in 1860 (Martin, 1971), and the existing data suggest that in 1890, the top 9% of the population held around 71% of all wealth, while the top 0.03% held an astonishing 20% (Bouroff, 1900). These figures indicate that the richest segment of the US population gained most from the 9-fold increase in total wealth between 1850 (US$ 7.2 billion) and 1890 (US$ 65 billion).

The same is true for the period between 1890 and 1929, in which the share held by the top 1% of total US wealth holdings increased from 26% to 44% (Ohlsson *et al.*, 2008). The historical trends of relative wealth concentrations in the UK and in France are similar to the US, but their levels were much higher. In 1740, the top 1% of UK households held around 44% of all wealth; this figure increased to 61% in 1875 and to a staggering 69% before the start of World War One (Lindert, 1986). The estimates for France suggest that the top 1% held around 43% of all wealth at the beginning of the 19th century, a figure that increased to around 55% by 1913 (Piketty *et al.*, 2006).

If one compares the share of the top 5% of wealth holders from 1850 with that from World War One, it becomes obvious that wealth inequality does not automatically rise

during the early stages of industrialization. While the top 5% saw their wealth share increase in the US and France, it remained relatively stable in Norway and the UK, while it even decreased in Denmark, Ireland and Sweden (Figure 1). For the middle- and end-periods of the 20th century, the picture is much more uniform across Western countries, with top wealth shares decreasing after 1930 in all eight countries for which data are available, and relative wealth concentration increasing after the mid-1980s in most of these countries (with the notable exception of France).

Figure 1: Top 5% wealth shares in eight Western countries, 1740 - 2007



Note: This figure shows the long-run trend of relative wealth concentration for those countries for which data are currently available (sources: Ohlsson et al., 2008; Roine and Waldenström, 2009; Turner, 2010; Wolff, 2010)

What causes allow wealth holdings to become so concentrated? In general, it is assumed that "a family's wealth is determined by (i) its age, and its history of: (ii) earnings, (iii) saving rates, (iv) rates of return, … (v) inheritances" (Davies and Shorrocks, 2000, p.613), as well as its educational level (D'Ambrosio and Wolff, 2001). To be more precise, wealth holdings among individuals of the same age are expected to be mainly unequally distributed due to earnings and saving rate differentials. The latter are assumed to differ because of varying consumption smoothing preferences or for inheritance reasons (see e.g., Modigliani and Brumberg, 1954; Friedman, 1957; Modigliani, 1988).

However, models based on life cycle savings and consumption smoothing are unable to explain precisely why some individuals are able to amass vast fortunes (Davies and

Shorrock, 2000).[3] One can argue that the willingness to amass wealth can be explained by the fact that capitalists accumulate wealth for the sake of wealth itself (Francis, 2009) or as a status symbol (Corneo and Jeanne, 2001). Nevertheless, these arguments do not convincingly explain why it is possible that a tiny minority of individuals can become more than 500,000 times wealthier than the median individual.[4] Many alternative explanations that attempt to explain such substantial differences are based on exploitation, monopoly rents, asymmetric information, and lobbying power (see e.g. Irving, 1896; Bouroff, 1900; Call, 1907; Stiglitz, 2012). Another explanation for this phenomenon could be sheer luck coupled with the outcome of a kind of natural physical law[5]: over time, the majority of existing wealth becomes automatically concentrated in the hands of fewer individuals because, after having gained some initial level of wealth, those individuals are able to exchange and invest more money and thus amass more and more wealth over time (see e.g., Bouchaud and Mézard, 2000; Buchanan, 2002; Levy and Levy, 2003; Yakovenko and Rosser, 2009).

While certainly more research is needed on this topic, all non-standard arguments mentioned above might help explain why relative wealth concentration decreased so sharply during the middle of the 20th century. According to Bouchaud and Mézard's (2000) model, high progressive taxes coupled with redistribution exert a dampening effect on wealth concentration in capitalist societies. This finding is in line with Ohlsson *et al.*'s (2008) observation that, next to the Great Depression and the two World Wars, rising taxation for top income earners and redistribution are important determinants in explaining the sharp decline of wealth concentration in industrialized countries during large parts of the 20th century.

[3] Standard theory assumes that people engage in savings behavior to ensure constant consumption over their lifetime. Arguably, a billionaire is neither saving to be able to keep his current consumption level after retirement nor to ensure that his children have a decent life style. Furthermore, Jappelli's (1999) research suggests that very rich households, in contrast to poor and middle-class households, do not significantly de-cumulate wealth in old age.

[4] The median wealth in Germany in 2007 was around 20,000 Euro (Frick and Grabka, 2009), for example. According to the Forbes Rich List, in 2007 the third richest German individual, Michael Otto, owned net assets with a worth of around 10 billion Euros, which was 500,000 times the median wealth.

[5] The idea that the distribution of wealth follows a universal natural law was first proposed by Vilfredo Pareto at the beginning of the 20th century. Pareto found not only that there exist "many individuals at the lowest end of the scale and fewer and fewer as you progress along the graph toward higher levels of wealth [but also] that they dwindled in a very special way toward the wealthy end of the curve: Each time you double the amount of wealth, the number of people falls by a constant factor. The factor varies from country to country, but the pattern remains essentially the same." (Buchanan, 2002, p.4).

Other possible reasons for this decrease of relative wealth concentration were stronger competition laws, better labor protection, and near full-employment. These heterodox approaches might also partly explain the rising concentration that emerged after 1980. From 1981 onwards, taxation in many developed countries became less progressive,[6] privatization and the emergence of global oligopolies and monopolies led to an increase in monopoly rents (e.g., in the IT sector), while the weakening of labor standards and an increase in unemployment reduced workers' bargaining power (Stiglitz, 2012). These phenomena probably are related to some extent to the increasing lobbying power of the wealthy (Haseler, 2000; Esteban and Ray, 2006; Wisman, 2013).

Additionally, the substantial increase of global stock market and real estate prices, the deepening of globalization, and the significant increase in top incomes might also have contributed to the trend change. It is well documented that financial assets and non-home real estate are highly skewed towards the rich (see e.g., Wolff, 2010), and recent results by Torgler and Piatti (2013) "indicate that globalization enhances super-richness" (p.357). Finally, Atkinson *et al.* (2011) show that the total income share of the top 1% was increasing after 1985 in all developing countries for which data are available (with the exception of the Netherlands and Switzerland). This point is especially important because increasing top income flows and top wealth holdings are mutually reinforcing. On the one hand, high income households have a higher propensity to save due to the fact that individuals have natural limits to consumption (for billionaires it is nearly impossible to spend most of their income on personal consumption). On the other hand, "wealth has a substantial impact on the share of income earned by those in the top 0.5 percent of the [adjusted gross income] distribution" (Tuttle and Gauger, 2006, pg. 506).

Therefore, one might even consider why reported wealth concentration levels have not grown to even higher levels in recent years. One reason is that prior to the crisis, the bottom 90% also saw considerable increases in wealth due to the stock market and housing bubbles. Another, probably more important, reason might be that much of the increased wealth concentration is not recorded in household surveys and tax statistics because of top-coding, sampling errors, nonresponses, misreporting, tax avoidance, and

[6] The average OECD central government top marginal wage income tax rate decreased by 22%-points between 1981 and 2007 (from 58% to 36%) and the average OECD net top statutory rate on dividend income decreased by 26%-points (from 57% to 21%) according to the OECD tax database (2012).

tax evasion. Reportedly, many rich households shift their funds to tax havens to avoid tax payments – estimates suggest that rich individuals are hiding between US$ 12 trillion (Palan *et al.*, 2010) and US$ 21 trillion (Henry, 2012) offshore.

3.2. Current extent of relative wealth inequality on a global scale

Recently, some studies have attempted to estimate current levels of wealth inequality between world citizens. All such studies are based on a very similar methodology, but estimate global wealth inequality levels for different years. Davies *et al.* (2010) studied the level of global inequality for the year 2000. They retrieved existing wealth level data from financial and non-financial balance sheet data for 39 countries covering around 61% of the world's population. To include the missing 39% of the world's population (190 countries), the wealth per adult was estimated via regressions (34% of the world's population) and region and income class imputations (5% of the world population). These results suggest that in 2000, the wealth inequality level between countries was around 60 Gini points. This level of inequality is nearly the same as that for income inequality between countries (see Milanovic, 2012).

In their second step, the authors estimated and imputed the wealth distributions within countries in order to measure global wealth inequality. For 20 countries, wealth distributions can be constructed from household survey data and tax records. However, in addition to their different sources, these data also have different units of analysis (household, family, and adult) and for some countries only decile shares are available. Thus, Davies *et al.* used a program to construct "a synthetic sample of 1,000 observations that conforms exactly with any valid set of quantile shares derived from a distribution of positive values" for these countries (2010, p.241). The same program was applied on an adjusted WIID income distribution dataset[7] to estimate the wealth distribution for an additional 124 countries. Finally, for 85 countries for whom insufficient information was available, the wealth distribution was imputed according to region and income classes.

The resulting estimates suggest that the global wealth Gini coefficient in the year 2000 was around 89 if official exchange rates are used (Table 1, first column), and

[7] Please note that the authors took into account the fact that wealth is less evenly distributed than income by multiplying the income figures with a constant ratio.

around 80 if the data are adjusted for purchasing power parity. The latter figure is around 10 Gini points higher than that of the global PPP income Gini coefficient, which was around 70 in 2000 (see Pinkovskiy and Sala-i-Martin, 2009; Milanovic 2012). Davies *et al.* (2010) furthermore conclude that the top decile owned 71% of total global wealth if the data are adjusted for purchasing power parity. Again, this figure is significantly lower than in the case of income inequality, where the top 10% receive less than 60% of global income (see Milanovic, 2012).

Table 1: Global wealth distribution 2000 - 2012

	2000		2010		2011		2012		Change 2000 - 2012	
	Gini coefficient	Mean wealth per adult (US$)	Gini coefficient	Mean wealth per adult (US$)	Gini coefficient	Mean wealth per adult (US$)	Gini coefficient	Mean wealth per adult (US$)	Δ Gini coefficient	Δ Wealth per adult (ratio 2012 to 2000)
Argentina	74.0	24,753	74.7	17,316	76.8	21,641	78.2	17,629	4.2	0.71
Brazil	78.4	8,300	79.6	25,270	79.5	34,439	81.2	24,600	2.8	2.96
Canada	68.8	108,464	68.3	225,896	72.3	245,455	72.8	227,660	4.0	2.10
China	55.0	5,672	69.0	17,126	69.7	20,711	68.9	20,452	13.9	3.61
France	73.0	103,619	75.8	255,156	75.4	293,685	75.5	265,463	2.5	2.56
Germany	66.7	89,770	68.4	164,561	75.0	199,783	77.7	174,526	11.0	1.94
India	66.9	2,036	77.8	4,910	80.4	5,548	81.3	4,250	14.4	2.09
Indonesia	76.4	2,502	77.3	12,112	81.2	12,109	82.0	10,842	5.6	4.33
Italy	60.9	119,773	62.6	226,423	61.3	259,826	64.6	212,910	3.7	1.78
Japan	54.7	191,877	60.7	201,387	60.1	248,770	59.6	269,708	4.9	1.41
Korea	57.9	32,969	60.7	70,751	68.0	76,621	72.6	69,646	14.7	2.11
Mexico	74.9	17,484	78.0	25,399	77.4	36,467	78.0	29,870	3.1	1.71
Pakistan	69.8	2,347	65.6	4,646	65.0	5,094	63.9	4,139	-5.9	1.76
Russia	69.9	1,708	70.6	10,408	91.6	10,911	91.4	12,161	21.5	7.12
Thailand	71.0	2,527	70.1	5,143	76.8	7,351	79.0	7,415	8.0	2.93
UK	69.7	162,999	71.7	229,940	67.0	257,881	67.5	250,005	-2.2	1.53
US	80.1	192,399	80.9	236,213	82.4	248,395	85.2	262,351	5.1	1.36
Vietnam	68.2	1,701	68.2	4,606	67.5	4,535	65.9	4,652	-2.3	2.73
World	**89.2**	**30,669**	**88.1**	**43,784**	**89.3**	**51,078**	**90.2**	**48,501**	1.0	**1.6**
Global top 10% share	**85.2%**		**82.8%**		**84.3%**		**85.6%**		**+0.4%-points**	
Global top 1% share	**40.1%**		**43.6%**		**44.2%**		**45.8%**		**+5.7%-points**	

Note: This table reports changes in wealth inequality within countries (via Gini coefficients) and changes in the mean wealth for selected populous countries and the world as a whole. The two bottom rows report the share of total global wealth held by the richest 1% and richest 10% of the population. All figures are based on official exchange rates. The last two columns report the change between 2000 and 2012 (sources: Davies et al., 2007, 2010; CS 2010, 2011, 2012; own calculations)

To estimate the level of global wealth inequality for the years 2010 - 2012, Credit Suisse (CS, 2010, 2011, 2012) has used very similar techniques to those described above. The most important difference between Davies *et al.*'s and CS's methodology is that the latter's study extrapolated the upper wealth tail according to a Pareto distribution.[8] CS's results suggest that the mean wealth per adult increased by 60%

[8] "[T]he number of billionaires reported by Forbes was used to fit a Pareto distribution to the upper tail of each of the 59 countries listed as having one or more billionaires. The top wealth values in the synthetic sample were then replaced by the new estimates, and the resulting sample for each country was re-scaled

between 2000 and 2012,[9] and that out of the most populous countries, only Argentina's adults experienced a wealth decrease during that period. It is furthermore interesting to note that the per capita wealth gap between richer and poorer countries has narrowed – countries like Japan, the US, and the UK increased their mean wealth per adult by a lower ratio than poor populous countries like Russia, Indonesia, China, Brazil, and India (Table 1, last column).

Inequality within the vast majority of populous countries, on the contrary, has increased over the same time frame; to be more precise, only Pakistan, Vietnam, and the UK have a lower Gini coefficient in 2012 than in 2000 (Table 1, second last column). This global increase in intra-country inequality explains the finding that the Gini coefficient in 2012 (90.2) was slightly higher than in 2000 (89.2), and explains also why the top 1% of world citizens could increase their share of global wealth by nearly 6%-points (Table 1, last row).

It can therefore be concluded that, while both studies find "very large inter-country differences in the level of household wealth ..., the principal reason for the high global inequality of wealth [is the] high inequality of wealth within countries" (Davies *et al.*, 2010, p.224) in general, and specifically, the high concentration of wealth at the top (in 2012, the top 1% of the global population held nearly 46% of global assets). It is important to keep in mind that the slight change in the methodology between 2000 and 2010 means that the figures are not one hundred percent comparable. Nevertheless, a trend of increasing global wealth concentration is evident. However, the relative concentration of wealth at the top was probably not exceptionally high compared to historical levels, at least when compared to the concentration of wealth in Western countries (as shown in Figure 1).

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to match the mean wealth value. This sequence was repeated until the process converged, typically after a few rounds" (CS, 2012, pg. 9).

[9] The changes in intra-country wealth levels depend on the changes in asset prices and exchange rates. The US Dollar appreciation of 2012, for example, is partly responsible for the decrease of the mean wealth per adult in some countries listed in Table 1.

4. High net worth individuals and absolute wealth concentration

4.1. High net worth individuals: What do we know?

The increase in relative wealth concentrations implies that absolute global wealth concentrations also increased recently. Unfortunately, "[o]fficial publications do not report estimates of absolute inequality, and even academic studies are rare" in the case of income (Atkinson and Brandolini, 2010, p.3) and non-existent in the case of wealth. To help close this gap, this section will provide an overview regarding recent changes in HNWIs' global wealth holdings, with the aim of giving a rough indication of today's levels of absolute wealth holdings at the top. Large parts of this analysis are based on data from publicly available private wealth reports – the three best known wealth reports are published yearly by Capgemini and Merrill Lynch (CML), the Boston Consulting Group (BCG), and CS.

There is a general consensus that HNWIs are rich individuals or households that have a net worth of at least one million US dollars. However, disagreement does exist over which asset classes should be included or excluded when calculating net worth: The World Wealth Reports from CML employ a definition that includes all equities, fixed income securities, cash and deposit holdings, real estate holdings (excluding primary residences), and alternative forms of investment by individuals, while consumables and consumer durables and collectibles are excluded. BCG's Global Wealth Reports are less inclusive, estimating household net wealth on the basis of "cash deposits, money market funds, listed securities … and onshore and offshore assets [while] wealth attributed to investor's own businesses, residences, or luxury goods" are excluded (2008, p.7). The estimates of the Global Wealth Reports from CS, on the contrary, are based on the most inclusive definition, which essentially comprises all individual wealth holdings considered in household balance sheets and household survey data.

Unfortunately, no precise information exists concerning the actual wealth holdings of HNWIs because "survey data from which … wealth distribution estimates are derived tend to under-represent the wealthiest groups and to entirely omit ultra high net worth individuals" (CS, 2010, p.9). Sometimes, such omissions are explicit (as discussed in Section 2). However, such omissions also reflect the reality that existing global governance arrangements allow HNWIs to be highly mobile and secretive, which means they store large proportions of their wealth in tax havens without reporting these amounts (Palan *et al.*, 2010; Shaxson *et al.*, 2012). All reported wealth figures

concerning HNWIs are therefore rough estimates that rely on different estimation techniques.

The estimates from CS are based on the methodology described above, also taking into account the observation that the existing "data indicate a good fit with a Pareto distribution for wealth levels above USD 250,000" (2010, p.9); this Pareto distribution is used to extrapolate wealth holdings for the top wealth tail across 216 countries. CML's estimates cover 71 countries (98% of global GDP) and are based on a two-step approach similar to CS's method: "wealth levels by country are estimated using national account statistics [that] are adjusted based on world stock indexes", and the wealth distribution within countries is "based on formulized relationships between wealth and income" (2008, p.34). The BCG wealth report is less clear about its methodology and only somewhat vaguely describes wealth estimates as based on "a comprehensive market study of wealth, which covered 62 countries representing more than 96 of global GDP, and an equally comprehensive benchmarking survey of 111 wealth managers, who oversaw a total of $ 9.9 trillion in client assets and liabilities" (2007, p.6).

The rough estimates of these three wealth reports suggest that in 2012, the global population size of HNWIs was between 12 and 28.5 million individuals (Table 2, lower section), whose global assets had a net worth of between US$ 46.2 and US$ 87.5 trillion, (Table 2, upper section). The CS estimates are naturally the highest among the three studies as primary residences, consumables and collectibles are included. BCG, on the contrary, excludes all real estate holdings, which most likely explains why its wealth estimates between 2001 and 2008 are lower than the CML estimates. When real estate wealth is added to BCG's estimates (i.e., if one adds the estimated real estate wealth of HNWIs, as reported by CML, to the BCG estimates) then BCG provides constantly higher estimates than CML from 2003 onwards. Thus, the CML estimates can be seen as a kind of lower boundary estimate of HNWIs' wealth holdings when a definition is used that includes real estate but excludes primary residences.

All of these estimates suggest that HNWIs are the biggest global investor group. In 2012, they had more assets under management than global pension funds (US$ 33.9 trillion), insurance companies (US$ 26.5 trillion), mutual funds (US$ 26.1 trillion), and sovereign wealth funds (US$ 5.2 trillion) (Maslakovic, 2013). Table 2 shows furthermore that HNWIs saw their total wealth holdings increase substantially between

1997 and 2012, and that the recent economic crisis only affected HNWIs negatively in 2008. To be more precise, CML claims that HNWIs' wealth holdings increased 2.4-fold between 1997 and 2012,[10] while BCG reports a 2.6-fold increase between 2001 and 2012. To put these figures in perspective: between 2001 and 2012, global GDP and total household wealth increased *only* 2.2-fold and 2.1-fold respectively,[11] with the result that the estimated share of HNWIs' wealth holdings to total global wealth increased from around 32% in 2001 to around 40% in 2012 (Table 2, middle rows).

Table 2: HNWIs' net wealth and population size

HNWIs combined net wealth (US$ trillion)																
	1997	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
BCG estimates					20.5	20.0	25.1	28.6	29.3	34.5	38.7	32.4	41.9	47.7	49.1	54.0
CML estimates	19.1	21.6	25.5	25.5	26.2	26.7	28.5	30.7	33.3	37.2	40.7	32.8	39.0	42.7	42.0	46.2
CS estimates														69.2	89.1	87.5
HNWIs wealth as percentage of global wealth																
	1997	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
BCG estimates					31.6	30.3	31.9	32.9	33.3	34.6	35.3	31.7	37.1	38.9	39.8	39.8
CS estimates														35.6	38.5	39.3
HNWIs population size (in million)																
	1997	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*
BCG estimates					6.1	5.8				9.6	10.7	9.0	11.2	12.5	12.6	13.8
CML estimates	5.2	5.9	7.0	6.9	7.1	7.3	7.7	8.2	8.7	9.5	10.1	8.6	10.0	10.9	11.0	12.0
CS estimates														24.2	29.6	28.5

Note: The upper section of the table compares different estimates of the HNWIs total net worth for different years. The middle section shows the estimated share of HNWIs wealth on total global wealth. The lower section demonstrates the estimated changes in the HNWI population. Boston Consulting Group's (BCG) estimates are household figures and only include financial wealth; Capgemini and Merrill Lynch's (CML) estimates exclude primary residences, consumables, and collectibles and are based on individual wealth; Credit Suisse's (CS) estimates comprise all individual wealth holdings (sources: BCG Global Wealth Reports; CML World Wealth Reports; CS Global Wealth Reports).

The distribution of millionaires and their wealth is very unevenly distributed across the globe. CS (2012) estimate that more than 40% of the high net worth population lives in North America, while around 30% and 25% are domiciled in Europe and Asia-Pacific. In contrast, CML's (2013) estimates are significantly lower for North America and much higher for the Asia-Pacific region (Figurer 2a). Both reports agree, however, that more than 90% of HNWIs population lives in Northern America, Europe, and the Asia-Pacific region.

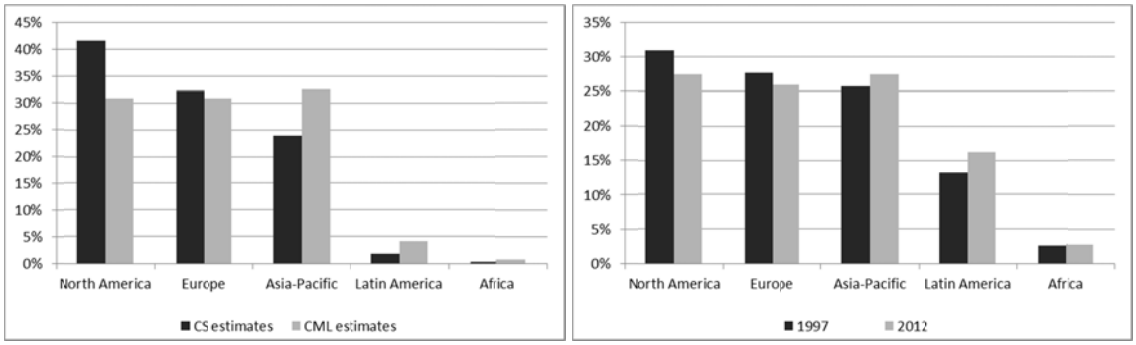
[10] Between 1986 and 2012 HNWI wealth increased even 6.6-fold according to CML's data – from US$ 7.2 trillion to US$ 46.2 trillion. During the same period global GDP *only* increased 4.8-fold in current terms – from US$ 14.8 to 71.7 trillion (WDI, 2013)

[11] World GDP increased from US$ 32.2 to US$ 71.7 trillion in current terms (WDI, 2013) during this time, while total household wealth increased from US$ 64.9 to US$ 135.5 trillion according to BCG estimates.

Only CML's reports provide HNWI wealth distribution estimates by region. According to their estimates, the share of Latin American HNWIs to total HNWIs' wealth was around 16%, while that from African HNWIs was around 3% in 2012. The higher wealth than population share suggest that especially Latin American but also African HNWI's, on average, are richer than their counterparts of other regions. Finally, it is interesting to note that, according to these estimates, HNWIs in both Latin America (3.1%-points) and the Asia-Pacific region (1.8%-points) saw their net wealth share increase, while HNWIs in North America (-3.4%-points) and Europe (-1.8%-points) saw their share decline (Figure 2b).

Figure 2: Distribution of HNWIs population and wealth by region

a. Population shares **b. Net wealth shares**



Note: The left graph compares the regional HNWI population estimates of CML and CS for the year 2012. The right graph is based on CML's estimates and compares HNWIs' wealth holdings by region for the years 1997 and 2012. Please see the table notes of Table 2 for information about the data (sources: CML World Wealth Reports; CS Global Wealth Report).

With regard to the richest HNWIs (hereafter called ultra-HNWIs), a meaningful comparison is unfortunately more difficult as comparably even fewer data are available and because different studies use different wealth thresholds. CML defines ultra-HNWIs as individuals having at least US$ 30 million net assets; for CS, the threshold is higher, starting at US$ 50 million, and according to the BCG definition ultra-HNWIs comprise only those households having more than US$ 100 million in private financial wealth.[12] Consequently, BCG's ultra-HNWIs wealth estimates (US$ 7.5 trillion in 2012) are much lower than CML's. According to CML, 111,000 ultra-HNWIs had a total net worth of US$ 16.3 trillion in 2012, while a study by Wealth-X (2013), using

[12] Other classifications of HNWIs include BCG's term 'established wealthy' (for households whose net worth lies between US$ 5 and 100 million) and CML's terms 'millionaire next door' and 'mid-tier millionaire' (for individuals with a respective net worth of US$ 1 million to US$ 5 million and US$ 5 million to US$ 30 million).

the same US$ 30 million threshold, estimates that the global ultra-HNWIs population totaled around 187,000, with a combined net worth of US$ 25.8 trillion. This sizeable difference is surprising as the exclusion (CML) or inclusion (Wealth-X) of primary residencies and consumables should not have a major impact on estimates of ultra-HNWIs' net wealth.

The financial crisis of 2008 seemingly affected ultra-HNWIs slightly more than ordinary HNWIs. According to CML's estimates, HNWIs lost 19% of their wealth in 2008 whereas ultra-HNWIs lost 24% (their net worth in 2007 was US$ 15 trillion and declined to US$ 11.4 trillion in 2008). In terms of population size, the difference was even more pronounced, as the HNWI population shrank by 15% while the number of ultra-HNWIs declined by nearly 25%. Apparently, the richest of the rich lost even more during the crisis. According to Forbes' (2013) estimates, the billionaires population shrank by 30% and their net wealth declined by 45% as a result of the crisis.

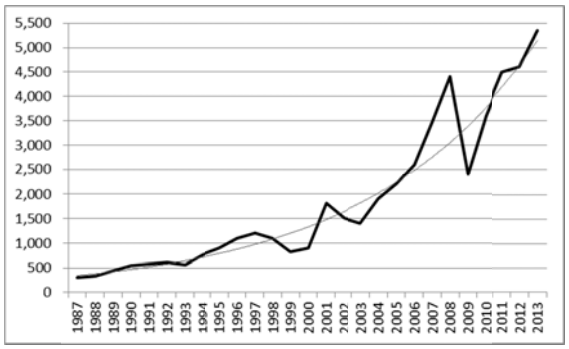
However, already in 2011, ultra-HNWIs and billionaires had more than recovered their crisis losses, so that the combined net wealth of billionaires in 2013 was US$ 5.3 trillion and their global population size was 1,352 (around 60% of whom reside in the US and Europe). This recovery means that billionaires' global net wealth continues to grow exponentially (Figure 3a).[13] Finally, it is interesting to note that between 2000 and 2012, the mean net wealth per billionaire apparently was rising faster than that of 'ordinary' global adults (Figure 3b). The mean net wealth per billionaire increased 1.9-fold during this period, while the mean net wealth per adult was *only* 1.6-times higher in 2012 than in 2000 (according to the estimates provided in Section 3.2). This comparison suggests also that, on average, 'ordinary' global adults suffered more from the crisis than persons having a net wealth above US$ one billion.[14]

[13] Forbes numbers might underestimate the wealth and population size of billionaires. Wealth-X (2013) estimates suggest that 2,160 billionaires had a combined net wealth of US$ 6.2 trillion in 2012.

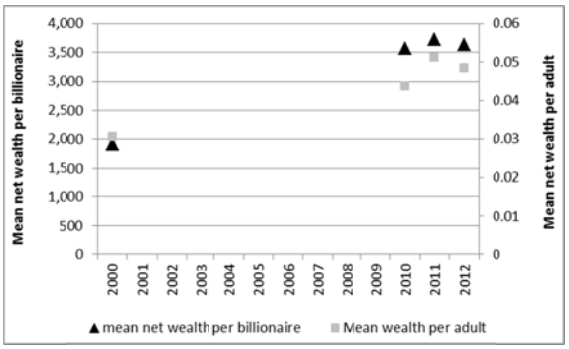
[14] It is difficult to compare all individuals between the lists due to name changes and deaths (the average billionaire age in 2007 was 62 years). Nevertheless, only three individuals/families that were among the top 100 billionaires in 2007 were not included in the Forbes' billionaires list of 2013. In other words, those individuals/families that are very rich tend to stay rich even during a strong economic crisis. This finding is in line with Saez's (2013) study reporting that in the US, "the top 1% captured 95% of the income gains in the first three years of the recovery".

Figure 3: Billionaires' global net wealth

a. Total global net wealth (US$ billion)



b. Mean net wealth per billionaire vs. mean net wealth per adult (US$ million)



Note: The black thick line of the left graph shows the change in the total net wealth of global billionaires between 1987 and 2013 (source: Forbes), while the gray thin line shows the trend during that period. The right graph compares the changes in the mean net wealth of billionaires (own calculation) and global adults (as reported in Table 1) between 2000 and 2012.

4.2. Today's absolute wealth holdings at the top in a historical perspective and policy implications

Given this vast amount of wealth in the hands of a tiny minority, the question arises if the current level of absolute wealth holdings at the top represents a historical peak. Unfortunately, no historical global estimates exist of rich individuals' holdings, along with the lack of an "exchange rate that would convert Roman sesterces or Castellan seventeenth-century pesos into dollars of equal purchasing power today. Even more, what 'equal purchasing power' might mean in that case is far from clear" (Milanovic, 2011, p.27).

To nonetheless obtain a rough estimate of this historical dimension, Milanovic (*ibid*) compares the wealth of the richest people in their time (Romans Crassus, Augustus, and Pallas; American industrialists Carnegie and Rockefeller; and the current richest individuals) with the respective average income of the working population at that time. He concludes that John D. Rockefeller was most likely the richest man ever in relative terms. In 1937, when his wealth peaked at US$ 1.4 billion, Rockefeller could have paid 116,000 US workers with the yearly returns of this wealth (assuming an interest rate of 6%), whereas Bill Gates could *only* have paid 75,000 US workers in 2005 and Crassus *only* could have commanded about 32,000 Romans in the year 50 BCE.

While this relative concept is interesting and innovative, it does, however, say nothing about the extent of today's absolute wealth concentration in comparison with that enjoyed by historical figures. To develop an idea regarding these differences, it is possible to determine the identity of the richest man in absolute terms by comparing the inflation-adjusted peak wealth of the above mentioned persons with the wealth holdings of today's richest billionaires. This method, unfortunately, is not applicable for the richest Romans but does enable a comparison of the absolute wealth holdings of the above-determined richest person of all time in relative terms – Rockefeller – with the absolute wealth holdings of today's richest billionaires. The result of this calculation suggests that Rockefeller's US$ 1.4 billion in 1937 is equivalent to around US$ 22 billion in 2012,[15] and reveals the astonishing fact that his peak wealth would not have placed him even within the top 20 global billionaires (according to Bloomberg's and Forbes billionaires list, one would need to have a net worth of at least US$ 23 billion to be among the top 20 at the end of 2012). Furthermore, it is interesting to note that at the end of 2012, each of the four richest men on earth – Slim, Gates, Ortega, and Buffet – were more than twice as rich, with the richest three times as rich as Rockefeller (Bloomberg, 2013).

Given these surprising results, one might argue that the US$ 1.4 billion estimate of Rockefeller's 1937 fortune is too conservative. Call (1907), for example, claims that Rockefeller's wealth at the beginning of the 20th century was at least US$ 2.5 billion. This claim rests on rather shaky foundations though.[16] Nevertheless, if one assumes, for the sake of argument, that Rockefeller's net wealth peaked earlier and was around US$ 2.5 billion in 1914, his inflation-adjusted wealth would still be lower than today's wealth holdings of either Slim or Gates.[17] This finding is especially remarkable when considering that in Rockefeller's time, few countries had very rich citizens, while nowadays Asian-Pacific, Latin American, and African countries host more than one fourth of the HNWIs population, nearly 40% of the billionaire population, and more than 45% of HNWIs net wealth (Figure 2). In other words, it is most likely that today

[15] Please note that the 1973 wealth was adjusted with the historic yearly CPI inflation rates readily available from the US Bureau of Labor.
[16] This claim is based on an article of a New York tabloid that states that Rockefeller's yearly income in 1905 was at least US$ 72 million. The New York Times in its Obituary from 1937 states however that, according to tax records, Rockefeller's net wealth was not more than US$ 800 million in 1918.
[17] Rockefeller's wealth in 2012 figures would be around US$ 60 billion, while Carlos Slim and Bill Gates had a net worth of around US$ 75 and US$ 63 billion, respectively.

the extent of absolute wealth holdings at the top is higher than ever before in human history.

This finding is important insofar as several researchers claim that the pressure of investor demand for safe securities was a main reason for the tremendous growth of the CDO market and the rise of shadow banking system prior to 2007 (Gros, 2009; Caballero, 2009; 2010; Bernanke, 2011; Pozsar, 2011; Lysandrou and Nesvetailova, forthcoming). According to recent estimates, one very important driver behind this demand were HNWIs who (i) helped to lower the yield of highly rated traditional bond classes, which put pressure on investors to seek alternative securities able to provide higher yields, and (ii) were the main investors in hedge funds, which, in turn, were the main buyers of CDOs (Goda and Lysandrou, 2013). The historically-high concentration of wealth at the top therefore poses a potential threat to the stability of the global economic system, as can be seen from the recent resurgence of the 'search for yield' phenomena (Fleming and Jenkins, 2013; Skypala, 2013, Tett, 2013).

The major policy implication that emerges from this analysis is that either the supply of safe investible securities ought to increase or the concentration of wealth ought to decrease to prevent the financial system from endogenously overexposing itself to systemic risk as occurred prior to the subprime crisis. The current aim to reduce government debt levels in developed countries is therefore counter-productive with regard to overall global financial stability. If big countries (like the US, the UK, Germany, France, and Japan) reduce their debt levels, even less investible securities will be available, which would increase the pressure to create other (more risky) assets to satisfy existing investor demand. However, it is questionable if a further increase in government debt is sufficient to accommodate rising demand for investible securities. Therefore, private sector wealth needs to become more evenly distributed to decrease pressure to create suitable 'wealth containers' for the vast amounts of accumulated wealth that exist today.

5. Conclusions

The figures discussed in this paper indicate that today global wealth inequality is very high (more than 90 Gini points), and that the richest 1% own nearly half of all global wealth. The reasons are that the mean wealth figures between countries are very

different (although the gap is decreasing) and, more importantly, the distribution of wealth within countries has become increasingly unequal since the 1980s. Having said this, the existing data suggest that relative intra-country wealth inequalities in developed countries are not extraordinary high in a historical perspective (in many Western countries, relative wealth concentration peaked early in the 20th century).

The level of absolute wealth concentration at the top, in contrast, is most likely higher than previously in history because (i) global wealth has increased in general, (ii) the global population of high net worth individuals has increased significantly, and (ii) the richest among those individuals are much richer than their counterparts at the beginning of the 20th century (i.e., their inflation-adjusted net worth is much higher). The presented data furthermore suggest that today's rich individuals recovered very quickly from the severe losses incurred during the financial crisis. This was especially true for billionaires, who already recovered fully from their losses by 2011, meaning that their net wealth holdings increased exponentially between 1987 and 2013. This situation has arisen because top incomes are increasing faster than those of the population in general, global asset prices continue to rise, taxation has become less progressive, much of their wealth is stored offshore, and the world has become more globalized.

In addition to ethical issues, this on-going concentration of wealth in the hands of a tiny minority is questionable insofar as the resulting increased demand for investible securities contributes to a safe asset imbalance that poses a threat to the stability of the global economic system. The presented results have to be treated with caution though, given that only few studies exist and that their estimates have severe shortcomings, mainly due to the woeful quality of the existing data. Therefore, a need exists not only to intensify research regarding changes in wealth distribution and its economic effects, but as well the need to improve the availability and quality of data.

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